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AUTHOR Soares, Louise M.; Soares, Anthony T.
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ABSTRACT

In order to dimensionalize further the construct of self concept through within-network nomological research, nine different self-scales descriptive of academic settings were administered to students in grades 1-12, their peers, and their teachers. The subjects were administered the Affective Perception Inventory (API), which measures nine dimensions of the self: (1) self concept as a person; (2) self concept as a student; (3) perceptions of self in English or language arts; (4) perceptions of self in mathematics; (5) perceptions of self in science; (6) perceptions of self in social studies; (7) perceptions of self in the arts; (8) perceptions of self in physical education; and (9) perceptions of self in the school environment. The API is a semantic differential device within a forced-choice format of four spaces of distance between pairs of sentences possessing dichotomous traits within the nine dimensions described. Scores were submitted to a multitrait-multimethod matrix formulation, discriminant analysis, and factor analysis, and subsequently yielded high internal consistency, convergent validity in some comparisons of Self and Peers, discriminant validity in specific scale-clusters, and a clear differentiation of the lower grades from the upper grades. Results suggest the possibility of earlier self-conceptualization than previously evidenced. (Author/RL)

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Louise M. Soares

Anthony T. Soares

University of Bridgeport
Bridgeport, Connecticut

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ABSTRACT

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Louise M. Soares
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In order to dimensionalize further the construct of self concept through within-network nomological research, nine different self-scales descriptive of academic settings were administered to students in grades one through twelve, their peers, and their teachers. The scores were submitted to a multitrait-multimethod matrix formulation, discriminant analysis, and factor analysis, and subsequently yielded high internal consistency, convergent validity in some comparisons of Self and Peers, discriminant validity in specific scale-clusters, and a clear differentiation of the lower grades from the upper grades. The results suggest a theoretical framework for the construct of self which is neither unitary nor hierarchical, but rather multidimensional in an individualized patterning of experience with the possibility of earlier self-conceptualization than previously evidenced.

Convergent and Discriminant Validation of Self-Perceptions

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The purpose of the study was to continue the search into the dimensions of the construct of self. Nomological studies have more often been conducted between networks rather than within networks of variables. The latter type is more difficult to carry out, of course, partly because of the greater complexity of the self and its resistance to compartmentalization. Yet, the self concept requires definition and clarification by way of within-network studies before proceeding to intervariable research, as Wylie has consistently asserted (1974). In addition, different abilities loosely grouped under the term, "self concept," should be more systematically identified, sorted, and categorized, in an effort to minimize intra-individual variation.

Those studies which have been conducted into the internal dimensions of the self have tended to describe the self concept as unitary (cf., Rosenberg & Simmons, 1973) or hierarchical (Shavelson, Hubner, & Stanton, 1976). Such studies fall short, however, since the self possesses greater complexity than either of these theoretical positions allows and continually indicates resistance to compartmentalization. Another position has been previously advanced in terms of a taxonomic paradigm with a cognitive-processing thrust (Soares & Soares, 1977, 1980).

The present study was therefore designed to refine the process of measuring self-perceptions by demonstrating the age differential in both

construct and discriminant validity and by formulating a more realistic thesis for probing the construct of self.

Methods

From suburban classrooms in Connecticut, 72 students were randomly selected (six from each of twelve grades), 120 peers of those students--also randomly chosen from the same classrooms (two for each self-rater, excluding grades one and two)--and 96 teachers of those students, giving a total subject pool of 288. All students and their peer counterparts were tested at approximately 11:00 am on Tuesday or Wednesday of the same week. The teachers concluded their own ratings of the students on the same day without viewing the responses of either the student self-raters or those of the peers.

The subjects were administered the Affective Perception Inventory (API), which measures nine dimensions of the self: (1) Self Concept as a person; (2) Self Concept as a student; (3) Perceptions of Self in English or Language Arts; (4) Perceptions of Self in Mathematics; (5) Perceptions of Self in Science; (6) Perceptions of Self in Social Studies; (7) Perceptions of Self in the Arts; (8) Perceptions of Self in Physical Education; and (9) Perceptions of Self in the School Environment. The API is a semantic differential device within a forced-choice format of four spaces of distance between pairs of sentences possessing dichotomous traits within the nine dimensions described (Soares & Soares, 1980).

Scores from each of the nine scales were submitted to a Multitrait-Multimethod Matrix design (Campbell & Fiske, 1959), and analysis proceeded on the basis of three raters--that is, Self, Peers, and Teachers--and four perspectives of age/grade clusters: Grades 1-3, 4-6, 7-9, and 10-12. The item scores were also submitted to a factor analysis, accompanied by

a Varimax rotated factor matrix, for scale and age. The data were additionally treated to discriminant analysis, with the discriminant functions of the nine scales being first derived; then the analysis and classification techniques were generated, as suggested elsewhere (Cacoullos, 1973; Lachenbruch, 1975), for grade comparisons.

Results

The original analysis for the multitrait-multimethod matrix formulation is noted in Table 1. The monotrait-monomethod (M-M) coefficients indicate moderately high to high internal-consistency reliability (values in parentheses along the outside diagonals). The monotrait-heteromethod (M-H) validity coefficients, noted in the boxes of the shorter diagonals, demonstrate some instances of convergent validity between Self and Peers especially. The heterotrait-monomethod (H-M) and heterotrait-heteromethod (H-H) coefficients suggest differential discriminant validity in that three varied pictures emerged: (1) A frequent clustering of Self Concept, Student Self, Language Arts, and School Perceptions; (2) divergence of Mathematics and Science Perceptions from each other as well as from (1) above and (3) below; and (3) a lack of consistency implicit in the responses from the Arts and Physical Education Perceptions scales.

Tables 2-5 provide a summary of the maximum, minimum, and median coefficients by age/grade groupings for the M-M correlations (reliability indicators), and the validity correlations for the M-H, H-M, and H-H comparisons. The M-M correlations, as obtained by the split-half method of Rulon (1939), yielded fairly high reliability coefficients of internal consistency. The highest values were obtained on the self-ratings and for grades 10-12.

The M-H validity coefficients indicated the greatest agreement of self- and peer-ratings (.73) from School Perceptions in grades 7-9 and a coefficient of .84 in grades 1-3. Most of the M-H coefficients were larger than the median heterotrait-heteromethod correlations. The lowest coefficients were generally found on the Arts scale.

The H-M correlations tended to show the greatest convergence of Self Concept and Student Self and the greatest divergence (or lowest convergence) on Mathematics and Physical Education Perceptions.

Construct validity requires the lowest coefficients with the H-H correlations, and such was the case with few exceptions. As with the M-H and H-M coefficients, the H-H correlations were highest for grades 1-3 and lowest for grades 10-12, probably as a result of the greater dispersion of the scores in the latter age/grade group.

In employing Discriminant Analysis on the same data, the initial procedures used the nine self-concept scores as discriminating variables. Because of the eigenvalues generated and the level of significance for the Wilks' Lambda method, only the first three derived functions seemed to have importance for further discussion. Therefore, these are listed in Table 6 and subsequently labeled as "Academic Self," "School Self," and "Humanistic Self," respectively. Figure 1 illustrates the relative positions of the twelve-grade centroids (mean vectors). The percentage of grouped cases correctly classified was 72.21% for the grades.

A summary of the factor analysis is indicated in Table 7. For all age levels, the number of factors generated for Self as a person, Self as a student, and Perceptions of Self in the School Environment tended to be

greater than for the perceptions of self in most of the disciplines. The Concept of Self in the Arts resulted in the greatest number of factors among the subject scales for all groups, although the English scale for the high school students also generated a high number of factors. The Mathematics and Science Perceptions scales indicated the smallest number of factors over the age groupings.

The highest factor loadings were found with the high school students in comparison to the students in the middle grades and the primary grades. The lowest factor loadings were found among the primary grade students.

In viewing the percent of variance of Factor I only in each of the scales, the differences among the age groupings is most striking (Table 8). The high school students accounted for the highest percent of variance in the Self as a Person scale, School Perceptions, Mathematics Perceptions, and Science Perceptions. The middle grade students indicated the highest percent of variance on Factor I for Social Studies and Physical Education; the youngest students, on Self as a Student and Language Arts scales. The age clusters were about the same on Perceptions of Self in the Arts.

Table 8 also notes the differences among the scales. There was a greater accounting for the amount of variance on Factor I loadings for Mathematics, Science, and Physical Education scales than for Self as a Person or the Arts Scales.

Conclusions

Internal consistency was found with all age groups. Although there was some confounding of self-pictures with the views held of the self by significant others--peers and teachers--for the younger students, all students seemed to be fairly discriminating about the pictures they hold

of themselves in various contexts, such as mathematics specifically or self as a student in general. Of course, the older students have shaped their self concepts more distinctly than the younger ones, but the latter are seemingly more differentiating than might generally be supposed. Surprisingly, teachers seem to be less perceptive than the peers of the students, which may be more a function of level of achievement as measured or determined by the teacher's method of assessment and less the conceptualization of the internal self.

Loevinger (1966) has indicated that the ability to form a self concept increases with age and education. As the ability to do so develops, the organism gradually forms a somewhat stereotyped, conventional, and socially acceptable concept of itself. With increasing maturity, the organism moves from such a predictable concept of self to one which is more differentiated and, perhaps, realistic. The results of the present study tend to support some of Loevinger's theoretical foundation, as briefly outlined above, but not completely. The present research suggests that the process of self-conceptualization may begin somewhat earlier than previously evidenced and also that the process of individualized differentiation may be evolving at an earlier age than some experts have hypothesized.

Although much additional research is required--at many levels--the evidence so far accumulated suggests not a general self concept influencing all behavior of individuals and not a hierarchical self concept which subsumes several role-descriptive selves, but rather a differentiating paradigm of self-perceptions--varying in breadth and depth--which develop independently according to experiences, capabilities, treatment from others, and individualized patter$\overset{n}{\wedge}$-detecting mechanisms by way of long-term memory. Figure 2

is a configuration of this theoretical position.

The next step in the continuing methodology of self-concept study may well be "image analysis" (Guttman, 1953), which could yield clearer factors and more definitive components through its search for common variances.

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Table 1

Multitrait-Multimethod Matrix

		Method 1								
		1	2	3	4	5	6	7	8	9
Method 1										
Scale 1	1	(.94)								
	2	.47	(.79)							
	3	.44	.66	(.89)						
	4	.27	.38	.27	(.81)					
	5	.41	.35	.37	.37	(.88)				
	6	.38	.39	.33	.25	.33	(.88)			
	7	.25	.42	.46	.13	.33	.23	(.63)		
	8	.45	.35	.23	.24	.41	.29	.21	(.84)	
	9	.47	.41	.49	.40	.46	.38	.38	.39	(.83)
Method 2										
Scale 1	1	[.49]	.32	.23	.20	.30	.11	.03	.32	.38
	2	.33	[.50]	.42	.40	.38	.20	.03	.19	.48
	3	.12	.45	[.49]	.41	.27	.09	.14	.05	.53
	4	.17	.38	.29	[.55]	.31	.07	.11	.19	.52
	5	.17	.46	.30	.25	[.51]	.14	.01	.22	.33
	6	.25	.36	.43	.24	.20	[.39]	.18	.16	.42
	7	.09	.17	.15	.09	.04	.11	[.38]	.02	.26
	8	.15	.14	.22	.05	.05	.20	.09	[.44]	.19
	9	.34	.50	.42	.47	.36	.16	.26	.14	[.76]
Method 3										
Scale 1	1	[.37]	.50	.29	.03	.13	.21	.17	.24	.23
	2	.30	[.74]	.41	.06	.23	.20	.19	.21	.36
	3	.29	.43	[.50]	.10	.28	.30	.24	.19	.43
	4	.06	.28	.23	[.47]	.25	.09	.05	.20	.26
	5	.22	.42	.27	.23	[.47]	.17	.03	.06	.30
	6	.25	.27	.37	.22	.14	[.47]	.07	.03	.46
	7	.06	.08	.20	.10	.08	.12	[.30]	.16	.23
	8	.29	.34	.34	.16	.11	.12	.02	[.33]	.33
	9	.24	.29	.24	.04	.23	.13	.20	.35	[.34]

	Method 2								
	1	2	3	4	5	6	7	8	9
Scale 1	(.82)								
2	.49	(.71)							
3	.51	.63	(.80)						
4	.51	.62	.42	(.85)					
5	.27	.50	.27	.50	(.81)				
6	.38	.52	.48	.53	.38	(.78)			
7	.39	.36	.40	.35	.35	.34	(.61)		
8	.27	.33	.25	.22	.32	.38	.30	(.69)	
9	.31	.59	.60	.52	.31	.51	.26	.33	(.68)
Scale 1	[.35]	.36	.30	.03	.14	.15	.14	.07	.52
2	.36	[.40]	.11	.08	.12	.25	.12	.08	.62
3	.03	.40	[.57]	.39	.36	.13	.17	.02	.32
4	.22	.16	.31	[.29]	.20	.18	.24	.02	.09
5	.20	.28	.36	.13	[.30]	.26	.31	.38	.12
6	.02	.03	.09	.05	.15	[.28]	.20	.17	.01
7	.33	.09	.20	.11	.04	.20	[.26]	.17	.31
8	.13	.27	.07	.26	.18	.20	.20	[.27]	.12
9	.46	.51	.08	.21	.13	.22	.14	.11	[.80]

	Method 3							
	1	2	3	4	5	6	7	8
Scale 1	(.66)							
2	.72	(.82)						
3	.71	.73	(.87)					
4	.09	.27	.31	(.86)				
5	.14	.41	.45	.52	(.84)			
6	.42	.46	.44	.13	.27	(.82)		
7	.08	.04	.22	.10	.12	.20	(.66)	
8	.28	.36	.29	.22	.14	.13	.03	(.81)
9	.48	.70	.70	.21	.21	.28	.11	.29

(.65)

KEY: Method 1--Self
Method 2--Peers
Method 3--Teachers

Scale 1--Self Concept
Scale 2--Student Self
Scale 3--Language Arts (English)
Scale 4--Mathematics
Scale 5--Science
Scale 6--Social Studies
Scale 7--The Arts
Scale 8--Physical Education
Scale 9--School

Figure 1

Separation of Grade Centroids
and
Approximate Centours in Reduced Space

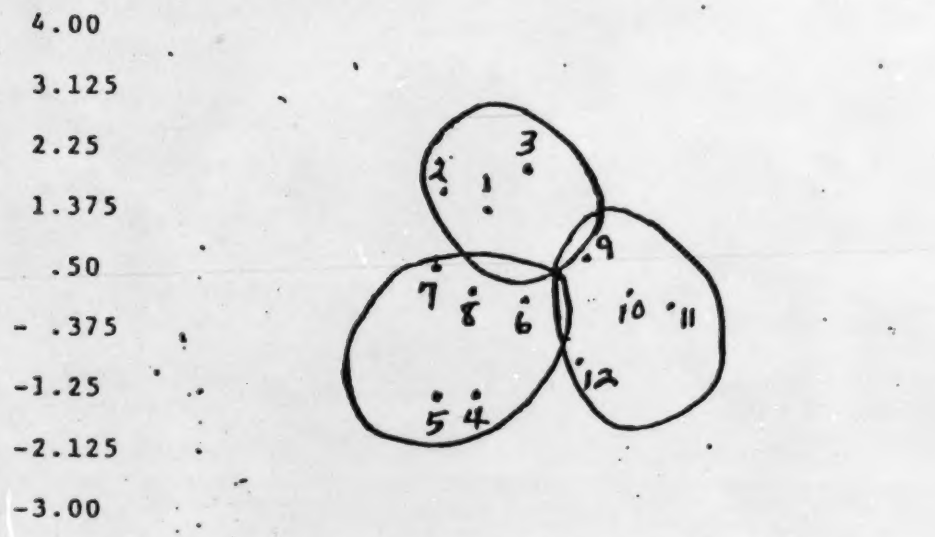

Table 6

Standardized Discriminant Function Coefficients
(First Three Only)

Scores	Function 1	Function 2	Function 3
1	.50204	-.40624	.14985
2	.53106	-.09856	-.28022
3	-.57914	.01035	-.22873
4	-.66798	.22240	-.32604
5	.35827	.06926	.40691
6	.32150	.05216	-.52095
7	-.04176	.07924	.84414
8	-.27749	-.49061	-.17625
9	-.22474	-.48038	-.31509

Table 7

Summary of the Number of Factors Generated

From a Factor Analysis of Self-Scales

Scale*	Test Form +		
	Primary	Intermediate	Advanced
1	7	7	7
2	3	6	6
3	3	4	6
4	4	3	2
5	3	2	1
6	4	2	4
7	5	4	4
8	3	2	3
9	6	5	5

CODES:

+ Primary/Grade 1-3
  Intermediate/Grades 4-8
  Advanced/Grades 9-12

* 1/Self as a Person
  2/Self as a Student
  3/Self in Language Arts
  4/Self in Mathematics
  5/Self in Science
  6/Self in Social Studies
  7/Self in the Arts
  8/Self in Physical Education
  9/Self in the School Environment

Table 8

Percent of Variance Accounted for in Factor I

as Generated from a Factor Analysis of Self-Scales

Scale	Test Forms		
	Primary	Intermediate	Advanced
1	37.4	48.4	54.8
2	69.4	46.1	52.3
3	64.8	59.9	51.3
4	51.9	71.5	92.1
5	68.6	88.7	100.0
6	51.5	85.4	75.7
7	50.5	53.8	52.2
8	68.4	89.2	85.5
9	49.8	64.8	74.9

Figure 2

Configuration of the Etiology

of

Self-Perceptions